

## Total Maximum Daily Loads (TMDLs) as Watershed Targets



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## Agenda

- TMDL Process under Clean Water Act
- Example TMDLs
- Relationship to NPDES and 319

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## Clean Water Act §303(d) Process: Establishing TMDLs

### A TMDL is. . . .

- A strategy for achieving WQS
- Based on the relationship between pollutant sources and the condition of a water body
- Describes an allowable pollutant load and allocates it among several sources

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## Pollutant

- Means dredged spoil, solid waste, incinerator residue, filter backwash, sewage sludge, munitions, chemical wastes, biological materials, (some) radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water

(CWA Sec. 502(6))

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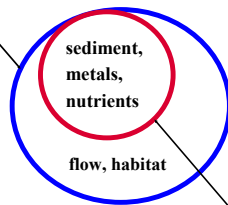
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Pollution



Pollutants

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Waterbody  
Uses

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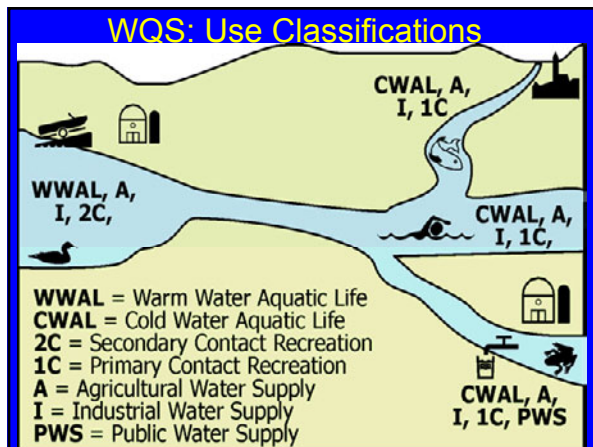
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**Water Quality Standards**

*(sampler)*

Parameter	Aquatic Life (acute)	Aquatic Life (chronic)	Agric. & Livestock	Drinking Water	Human Health (fish)
<b>Cadmium</b> (ug/l)	3.9 (1 hour)	1.1 (4 day)	10 (30 day)	10 (1 day)	--
<b>Mercury</b> (ug/l)	2.4 (1 hour)	0.012 (4 day)	--	2.0 (1 day)	0.3 mg/kg
<b>Selenium</b> (ug/l)	20 (1 hour)	5 (4 day)	20 (30 day)	170 (30 day)	9000

Magnitude      Duration      Frequency

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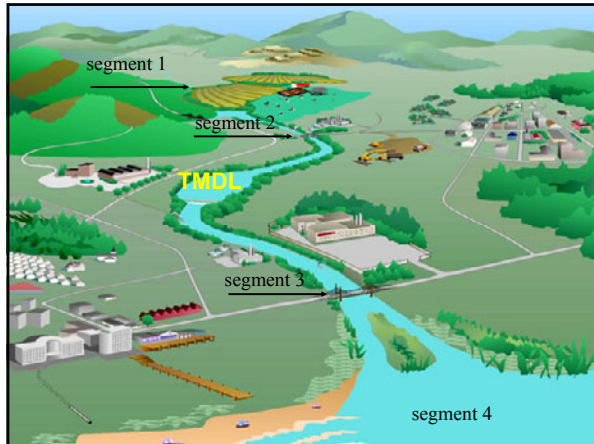
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Develop Strategies (TMDLs)

## TMDLs

- Amount of a specific pollutant that a waterbody can receive, assimilate, and still meet water quality standards
- States and tribes are required to develop TMDLs for waters on their 303(d) lists
- TMDLs are approved or disapproved by EPA; if disapproved, EPA develops the TMDL
- [www.epa.gov/owow/tmdl/](http://www.epa.gov/owow/tmdl/)

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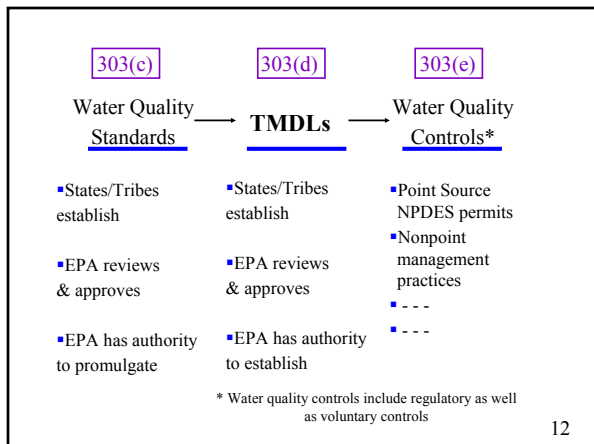
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## Elements of a TMDL

- Allowable pollutant load (cap)
- Allocation of cap among sources
- Margin of safety (MOS)

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## TMDL Definition

$$\text{TMDL} = \Sigma \text{WLA}_i + \Sigma \text{LA}_i + \text{MOS}$$

$\Sigma \text{WLA}_i$ : Sum of waste load allocations (point sources)

$\Sigma \text{LA}_i$ : Sum of load allocations (nonpoint sources)

MOS: Margin of Safety

- Extra measure of protection due to uncertainty
- Can be explicit (e.g., 10%) or implicit (safety factors and assumptions in modeling, etc.)

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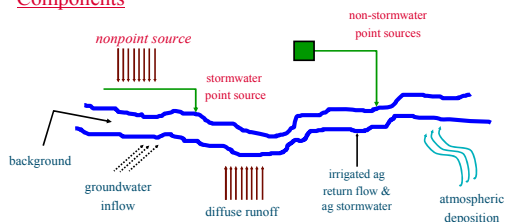
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### Wasteload Allocation Components



### Load Allocation Components

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## TMDL "Caps"

- For specific pollutants
  - Sediment, nitrogen, phosphorus, temperature, copper, mercury
- For pollutant indicators
  - BOD, COD
- Not necessarily daily (Anacostia decision)
  - Could be weekly, monthly, yearly
- May vary seasonally

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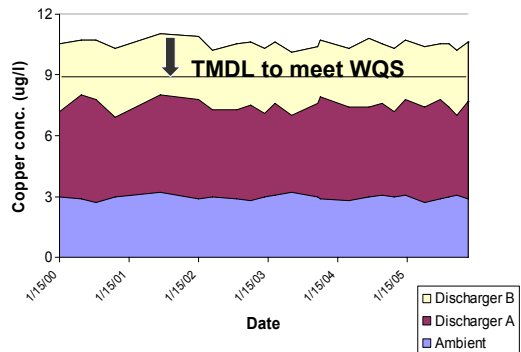
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### No Remaining Assimilative Capacity for Copper

- need a TMDL to meet WQS



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TMDLs can be described as:

- mass per time (e.g., pounds per day)
- toxicity (e.g., toxic units)
- other measure (e.g., % reduction)

Ref: 40 C.F.R. Part 130.2(i)

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## TMDL: Allocations

- Each **point source** with an individual NPDES permit receives a wasteload allocation (WLA)
- **Point sources** covered under general permits can also get a wasteload allocation (WLA)
- Individual sources, categories, subcategories of **nonpoint sources** are represented by a load allocation (LA)

No EPA rules on how to allocate

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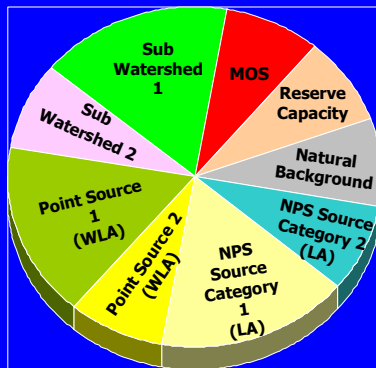
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## TMDL Allocation



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Insert Barb's slide here

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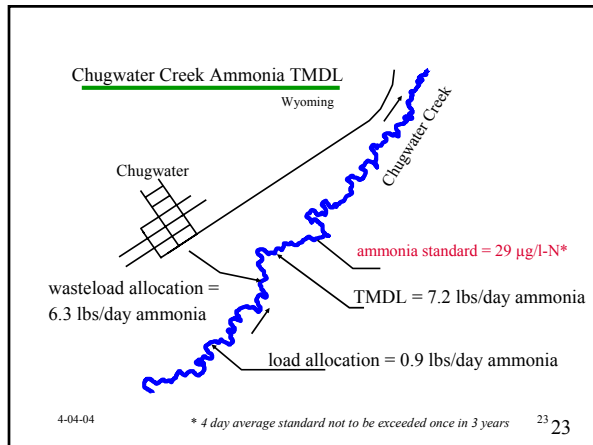
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## Agenda

- TMDL Process under the Clean Water Act
- **Example TMDLs**
- Relationship to NPDES and 319

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## Recommended Sediment and Phosphorus Allocations for Pleasant Run, VA

Develop Strategies (TMDLs)

Source Category	Sediment Load Allocation (lbs/yr)	Sediment % Reduction
Row Crops	3,007,955	70%
Pasture/Hay	734,632	70%
Barren	73,719	80%
Forest	16,505	0%
Water	0	0%
Urban (grouped pervious & impervious areas)	137,297	70%
Groundwater	0	0%
Point Sources (WLA)	0	0%
Septic Systems	0	0%
TMDL Load (minus MOS)	3970,108	

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Develop Strategies (TMDLs)

## Black River, WA - Assembling the Phosphorus and Nitrogen TMDL

**Water Quality Indicators**

- Dissolved oxygen 8.0 mg/L
- Total phosphorus 0.05 ug/L

→ **TMDL**

- 929 lb/day BOD5 (May 1 to October 31)
- 263 lb/day NH<sub>3</sub>-N (May 1 to October 31)
- 29.3 lb/day TP (May 1 to October 31)

→ **Water Quality Controls**

- NPDES discharge limits for point sources
- Improved BMPs at dairy operations
- Narrative LA for future growth

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Sediment TMDLs- Instream and Hillslope Targets	
Indicators/ Targets	Allocations
<u>Instream:</u> <ul style="list-style-type: none"> <li>Median particle size &gt;12 mm</li> <li>&lt;15% fines &lt;0.85 mm</li> </ul>	Landowner 1: <ul style="list-style-type: none"> <li>Reduce erosion-prone mileage by 12 miles</li> </ul>
<u>Hillslope:</u> <ul style="list-style-type: none"> <li>Attain &lt; 3 miles roads with erosion potential per square mile study area</li> </ul>	Landowner 2: <ul style="list-style-type: none"> <li>Reduce erosion-prone road mileage by 5 miles</li> </ul>
<u>Instream:</u> <ul style="list-style-type: none"> <li>V* &lt; 0.2</li> <li>&gt;50 redds per mile</li> </ul>	Reduce length of eroding banks by <div style="margin-left: 20px;">             Tributary 1: 25%              Tributary 2: 5%              Tributary 3: 10%           </div>
<u>Hillslope:</u> <ul style="list-style-type: none"> <li>Attain &lt;10% actively eroding streambanks</li> </ul>	

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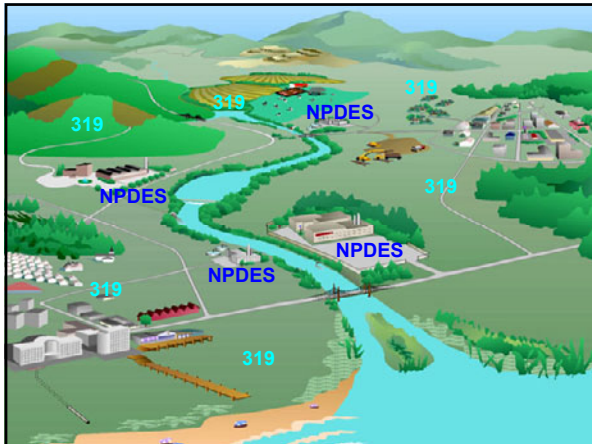
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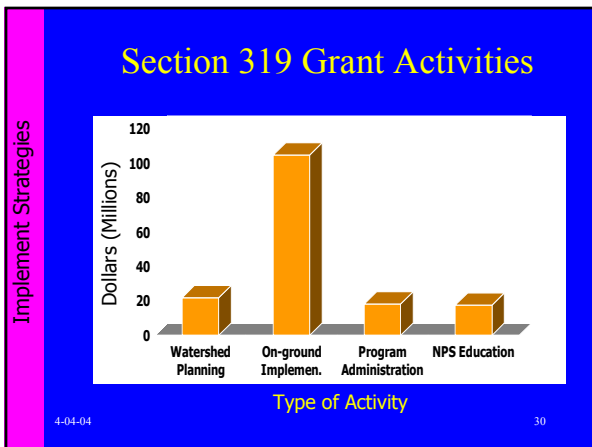
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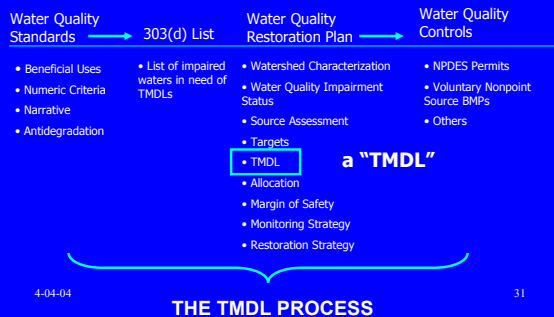
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## Review: What is the TMDL process?



### TMDL Summary Points

- TMDLs and the TMDL Process are driven by Water Quality Standards
  - TMDLs are designed to meet all applicable WQS
- Assimilative Capacity – amount of a pollutant that a waterbody can receive and still meet WQS
  - TMDLs calculate assimilative capacity, and allocate allowable loads for all the different sources into the system
- Wide Flexibility in TMDL Approaches and Measures